

Appendix A: Review and Assessment Approach



Safety & Mission Assurance Review & Assessment Approach

NASA Office of Safety & Mission Assurance
Review & Assessment Division (QV)

August 2004

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QV Business Units

1. Institutional/ Facility/ Operations Review and Assessment

- Compliance Verification
 - OQE Identification
- Capturing Best Practices & Lessons Learned

2. Programmatic Review and Assessment

- Compliance Verification
 - Programmatic Implementation of SMA Requirements
- Capturing Best Practices & Lessons

3. Operational Readiness Review –

- Decision Support
- Knowledge Understanding & Visibility into Compliance with Req'ts, Process Capability, Technical Issues, Minority Opinions & Residual Risk

4. Special Projects and Benchmarking

- Seek to Continually Improve NASA SMA Practices & Safety Culture

5. Process Based Mission Assurance Knowledge Management System

- Right SMA Info / Right Place Right Time / Best Practices / Lessons Learned / Case Studies / Work Groups / Web Meetings

2

Overarching Audit Approach

- Verify flow-down of NASA SMA policies (requirements) from HQ to Center or Program procedures
- Verify processes are in place to implement the procedures
 - verify process is stable, capable, and controlled
- Verify practice corresponds with procedures
 - Observe practices and verify compliance through **"in- process audit"**

3

Best Practice Perspective

- Considers Presidents Management Agenda
- Considers CAIB Recommendations Findings & Observations
- Builds on previous functional audit experience (Process Verification)
- Builds on previous Programmatic Assessment experience (SLWT, X-33, X-34, X-37, ELV, SSP-USAGO)
- Builds on NASA/Navy Benchmarking Exchange (NNBE) experience (2002 – present)
 - see <http://pbma.hq.nasa.gov>
- Builds on NNBE participation in functional audit of Supervisor of Shipbuilding & Electric Boat Corporation, Groton Ct.
- Builds on recent NASA participation in functional audit of Pearl Harbor Naval Shipyard & Intermediate Maintenance Facility

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Proposed Audit Approaches

- Establish clear, concise, executable, measurable, verifiable requirements – no “fuzz balls”
- Carve out distinct boundaries for individual audits (Institutional / Programmatic) to add emphasis & clarity
- Define and employ a simple, manageable, understandable set of focused audit areas to enable broad understanding and context for the audit (see attachment)
- Provide guidance with respect to implementation of requirements / conduct technical assistance visits
- Populate audit teams with participants from IA, IV&V, NESC, center Engineering Directorates, Technical Directorates, center SMA, HQ SMA, HQ enterprises, NAVSEA and/or other government organizations
- Selectively employ a “time-flexible” audit approach to enable observation of critical assurance activities when they are being conducted
- Seek synergy between SMA audits with other NASA HQ review and assessment activities / reciprocity of certification / teaming on certain subject areas
- Adaptation of successful NASA & NAVSEA practices

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NASA SMA Requirements Grouping

Group I: OVERARCHING SMA PHILOSOPHY & POLICY (4) Foundation Documents

Top SMA Doc, NPD 8700.1A
Risk Management, NPR 8700.4
Safety, NPD 8710.2C
Annual Operating Agreements - Center specific SMA “management contracts”

Group II: INSTITUTIONAL / OPERATIONAL SAFETY (IOS) GROUP (10) Safety Implementation

OSHA HB, NPR 8715.1
Safety Manual, NPR 8715.3
Facility Safety, NSS 8719.7
Pressure Vessels, NPD 8710.5A
Pressure Vessels, NPR 8715.4
Underwater Facility Safety, NSS 1740.10
Lifting Devices, NSS 8719.9
Fire Protection, NSS 8719.11
Facility Operations Readiness Review, NSS 8719.1
Aviation Safety, NPR 7900.3 (Code O=OPR)

Group III B: PROGRAM IMPLEMENTATION (24) Designing / Building / Testing / Operating / Retiring

Reliability, NPD 8720.1A
New PRA Doc, 8705.XX
Rel. Png for Pgms, NSS 8729.1
Orbital Debris, NPD 8710.3A
Range Safety, NPR 8716.X
S/W IV&V Directive NPD 8730.4
S/W Assurance Standard, NSS 8739.8
S/W Formal Insp.Std, NSS 2202.93 *
S/W Safety Std, NSS 8719.13A
S/W Doc Req, NSS 2100-91*

S/W Eng Requirements, NPR 7150

QA Placeholder Doc
Parts, NPD 8730.2A
Parts/GIDEP, NPR 8735.1A
Calibration, NPD 8730.1A
Supl. Audit Surv, NPR 8735.2*
NSS Wire Crimp & Cable
NSS Fiber Optics
NSS Soldering
NSS Surface Mont
NSS Conformal Coating

Hydrogen Safety, NSS 1740.16
Explosive Safety, NSS 1740.12

Group III A: Program Specific Implementation of SMA Requirements (6) Critical Flow-down of SMA Req. Baseline

Pgm & Prj Mgmt, NPD 7120.4 and NPR 7120.5C
• PCA
• Program Plan
• Project Plan
• Project SMA Plan
• Level 0/1 Requirements
SMA Implementation within Contract / MoUs / Grants (e.g. Systems Effectiveness Plan or equivalent)
[NASA FAR Supplement Requirements (Risk Based Acquisition Mgmt) Implementation]

Group IV: PROGRAM CLASS - REQUIREMENTS DOCUMENTS (10) Unique To Specific Programs

Inst / Launch Serv, NPD 8700.3
Payload Class, NPR 8705.X
Human Rating, NPR 8705.2
ELV SMA R&R, NSS 8709.2
ELV/Payload Safety Review, NSS 8719.8
ELV Oversight, NPD 8610.23 (Code M=OPR)
ELV Review, NPD 8610.24 (Code M=OPR)
ELV Risk Mitigation, NPD 8610.7 (Code M=OPR)

Group V: CONTINGENCY / RECOVERY / INVESTIGATION (6) Preparing For & Responding To Incidents

Continuity of Operations, NPD 1040.1
Continuity of Operations, NPR 1040.4
Emergency Preparedness, NPD 8710.1A
Emergency Preparedness, NPR 8715.2
Mishap, NPD 8621.1A
Mishap Investigation, NPR 8621.1H

Scope Institutional/Facility Audits to Account for Recent Third-party Audits/ Reviews/Inspections

<p>OTHER RELEVANT ASSURANCE REVIEW ACTIVITIES</p> <p>Exercising Oversight of Institution or Facility</p>	<ul style="list-style-type: none"> - Operations Engineering Panel (OEP) - Operational Readiness Inspection - OSHA Periodic Inspections - OSHA Complaint/Fatality Inspection - OSHA VPP Evaluation - Quality Inspection (compliance verification) - FAA Inspections - DOE Audit - Interagency Nuclear Safety Review Panel (INSRP) - Inter-center Aircraft Operations Panel (IAOP) - Mishap/Close-Call Investigations - Nuclear Regulatory Commission (NRC) - Code J Environmental Audits - Code Z Medical/Health Audits - NESC - Aerospace Advisory Panel
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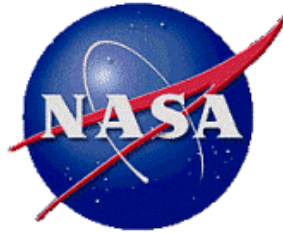
Scope SMA Programmatic Audits to Account for Recent Third-party Audits/ Reviews/inspections

<p>OTHER RELEVANT ASSURANCE REVIEW ACTIVITIES</p> <p>Exercising Oversight of Program/Project</p>	<ul style="list-style-type: none"> - CD Review of Program Readiness - Center Program Management Council (PMC) - ISO Registration Audits - ISO Internal Audits (external to Program) - NASA SMA Operations Review - NESC - NASA SMA Technical Assessments - Independent Technical Authority (ITA) - IPAO - SMOs - INSRP - ASAP
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Appendix B: Programmatic Review and Audit Process

Safety and Mission Assurance Program Audit and Review



Code QV Review & Assessment Division

August 2004

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Introduction



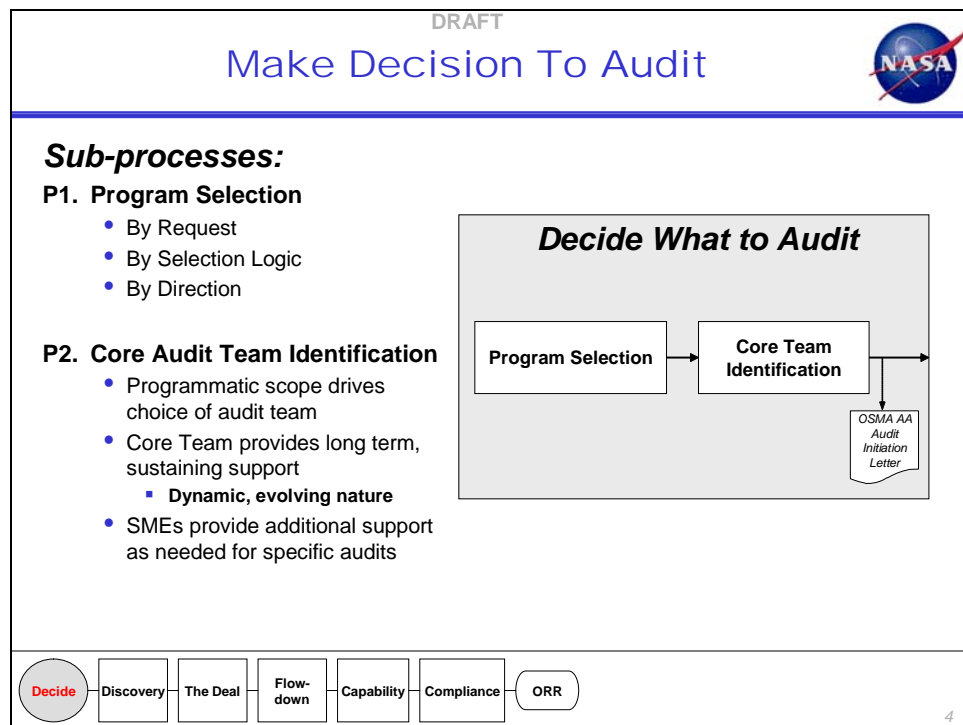
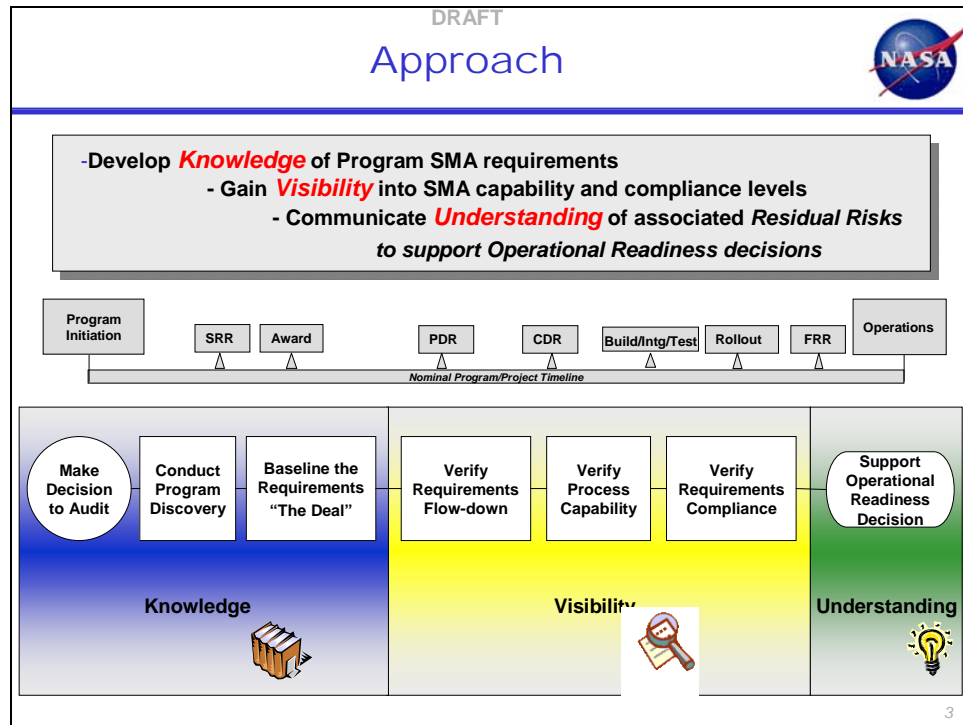
What did that GIDEP report
say about trestle fatigue
problems?

Don't worry, we eliminated
the GIDEP requirement
last year to save money!



*SMA Knowledge, Understanding and Visibility
Could Prevent A Train Wreck*

2



Conduct Program Discovery



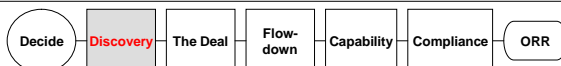
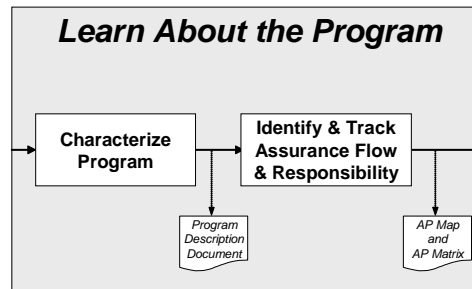
Sub-processes:

P3. Characterize Program

- Gather information
 - Documentation Review
 - TIMs
- Develop Program Description Document

P4. Identify & Track Assurance Flow and Responsibility

- Develop Assurance Process Map and Assurance Process Matrix
- Track evolving, dynamic nature of program



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Baseline the Requirements



Sub-processes:

P5. Requirements Filtering

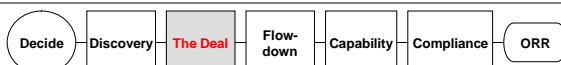
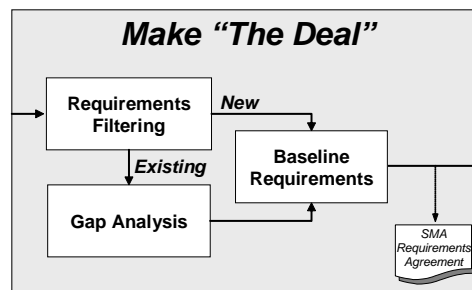
- New Programs – Core Team identifies program-specific HQ SMA requirements

P6. Gap Analysis

- Existing Programs – Core Team performs requirements gap analysis

P7. Baseline Requirements

- Program-specific SMA requirements for new programs
- Deltas to SMA requirements based on existing program contract requirements



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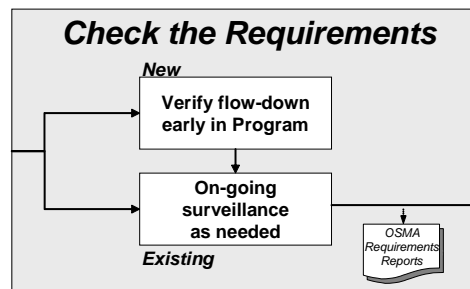
Verify Requirements Flow-down



Sub-processes:

P8. Verify Requirements Flow-down

- Verify flow-down of baseline SMA requirements to all levels
 - Conduct early during SRR/RFP stage for new programs
- Conduct surveillance of SMA requirements flow-down as needed for existing programs
 - Existing contractual SMA requirements
 - Deltas to baseline requirements
 - New subcontracts



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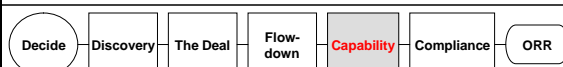
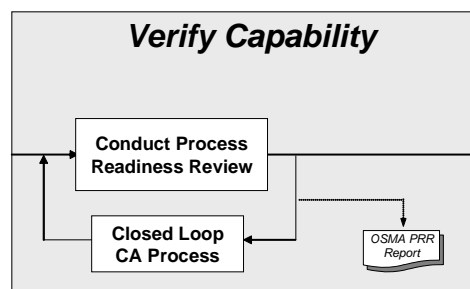
Verify Process Capability



Sub-processes:

P9. Process Readiness Review

- Conduct between contract award and PDR for new programs
- Conduct as appropriate for existing programs
- Assess for each Implementing Organization - *Is there sufficient "water pressure?"*
 - Staffing
 - Skill Mix
 - Tools
 - Funding
- Initiate closed loop CA Process



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Verify Requirements Compliance



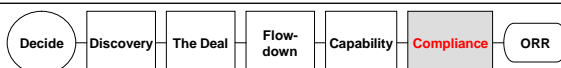
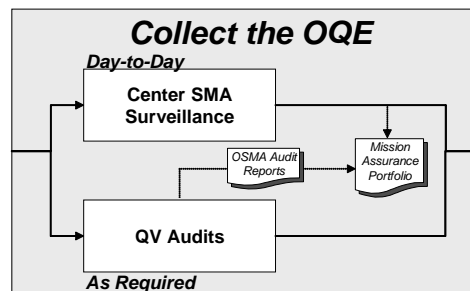
Sub-processes:

P10. Center SMA Surveillance

- New and existing programs:
Center SMA ongoing support to initiate & track OQE

P11. QV Audits

- New and existing programs:
Periodic Code QV verification of implementation of applicable requirements set
- Leverage other IA's to conduct audits
 - NESC, IPAO, IV&V, etc.



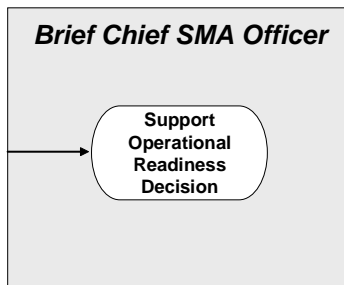
9

Support Operational Readiness



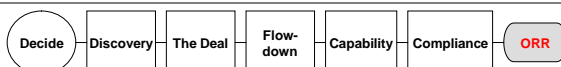
P12. Programmatic Audit & Review Input to ORR

- Present Residual Risk Profile to Chief Safety and Mission Assurance Officer
- Summarize audit / review findings regarding requirements:
 - Baseline
 - Flow-down
 - Implementation Processes
 - Compliance
- Present any reqmts. issues that deserve attention



ORR Risk Summary

Assurance Elements	Program	Center S&MA	NESC	QV Audit	..
SMA Req. Compliance	0	0	1	3	-
Changes	0	0	0	0	-
Technical Issues	1	1	5	0	-



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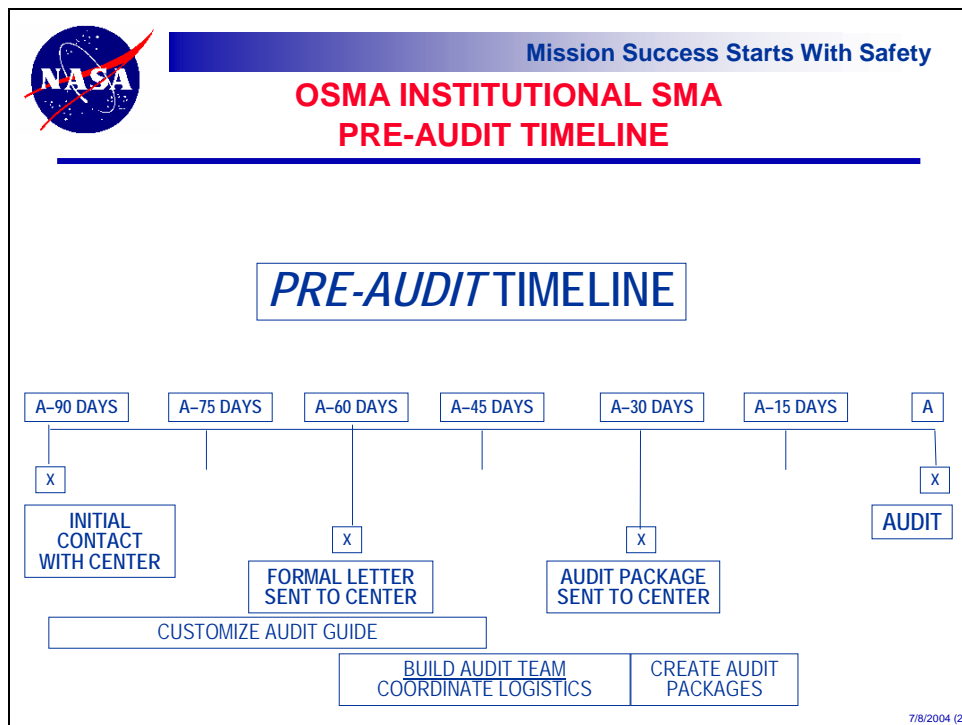
Appendix C: Institutional Review and Audit Process



Mission Success Starts With Safety

NASA INSTITUTIONAL/FACILITY/OPERATIONS SMA AUDIT PROCESS

(1)





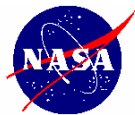
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EXAMPLE OF INSTITUTIONAL SMA PRE-AUDIT TIMELINE

- **EXAMPLE: Scheduling of Institutional SMA Audit for “Langley Research Center (LaRC)”**
- **Near-term Audit Milestones:**
 - 8/15/04 - Initial Contact with LaRC
 - 8/15/04 - HQ/QV & LaRC discussing/ negotiating Audit Review Areas, Procedures and Logistics to be conducted
 - 9/15/04 - Formal Audit Announcement Letter issued to LaRC
 - 10/01/04 - LaRC Specific Audit Guide complete
 - 10/10/04 - Audit Team for LaRC selected
 - 10/10/04 - Initiate Logistics (Include Scheduling Interviews with SME for Audit Review Areas) for Audit Week
 - 10/15/04 - Audit Review Package for LaRC sent

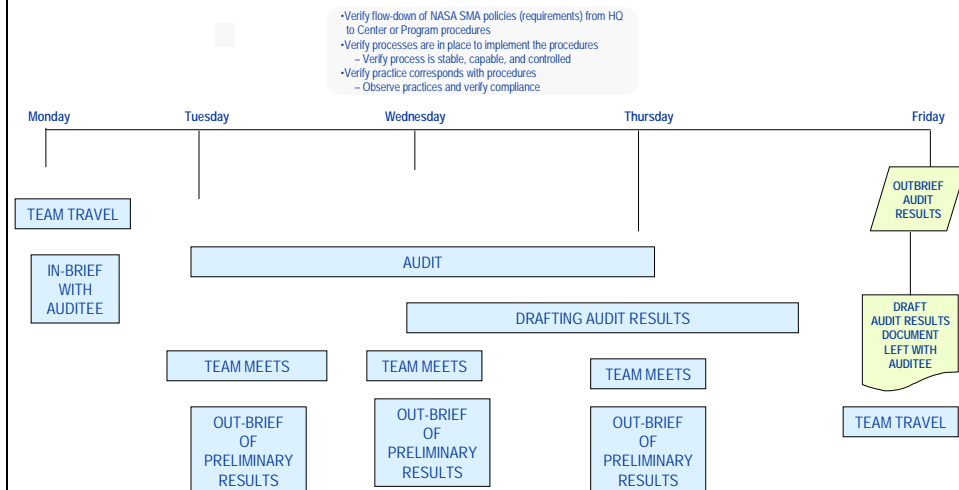
Mid-November 2004 Audit

7/8/2004 (3)



Mission Success Starts With Safety

OSMA INSTITUTIONAL SMA AUDIT TIMELINE



7/8/2004 (4)

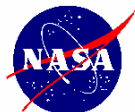


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INSTITUTIONAL SMA AUDIT REVIEW TIMELINE

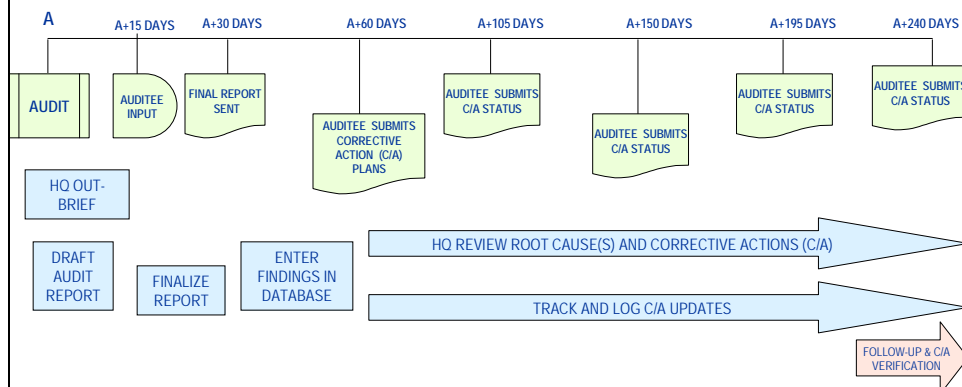
- One Week Audit
- Audit Team
 - OSMA Division Director (Team Lead)
 - 5-7 Team Members (Dependent Upon Review Areas)
 - 2-4 OSMA Contractor Support by Perot Systems Government Services & ARES
- Audit Schedule:
 - Mon. Afternoon: Audit Team In-Briefing to Center Senior Mgmt.
 - Tues. - Thurs.: Conduct Audit Reviews
 - Tues. - Thurs. (COB): Daily Briefing by Audit Team of Preliminary Audit Results to Center Senior Mgmt.
 - Fri. Morning: Audit Team Out-Briefing to Center Director, Center Senior Mgmt., & respective Headquarters' IPO accompanied by Draft Document of Audit Results

7/8/2004 (5)



Mission Success Starts With Safety

OSMA INSTITUTIONAL SMA POST-AUDIT TIMELINE



7/8/2004 (6)



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INSTITUTIONAL SMA POST-AUDIT REVIEW TIMELINE

- Review and Update of Draft Audit Results Document by Audit Team
- Headquarters' OSMA preparing Draft Final Audit Report
- Draft Final Audit Report submitted to Center Senior Mgmt. for Review and Comment
- Final Audit Report issue by Headquarters' OSMA Officer to Center Director for Formal Response and Corrective Action; provide to Headquarters' IPO for Information

7/8/2004 (7)